

**U. S. DEPARTMENT OF ENERGY
WORK BREAKDOWN STRUCTURE DICTIONARY
PART II - ELEMENT DEFINITION**

1. PROJECT TITLE/PARTICIPANT Environmental Management/Paducah Remediation Services, LLC (PRS)		2. DATE 06/29/07	3. IDENTIFICATION SITE Paducah Project DOE Portsmouth/Paducah Project Office (PPPO)
4. WBS ELEMENT CODE 04.11.10.11		5. WBS ELEMENT TITLE Out-year D&D of C-340	
6. INDEX LINE NO. N/A	7. REVISION NO. AND AUTHORIZATION Rev. 0		8. DATE 06/29/07
9. APPROVED CHANGES N/A			
10. SYSTEM DESIGN DESCRIPTION N/A		11. BUDGET AND REPORTING NUMBER N/A	
12. ELEMENT TASK DESCRIPTION <p>THIS IS A PLANNING LEVEL WBS DICTIONARY</p> <p><u>WBS STRUCTURE</u></p> <p>The scope of this element includes the following sub-elements</p> <ul style="list-style-type: none"> • WBS 04.11.10.11.01 C-340 Subproject Management • WBS 04.11.10.11.02 C-340 Infrastructure • WBS 04.11.10.11.03 C-340 Facility & Structure • WBS 04.11.10.11.04 C-340 Newly Generated Waste • WBS 04.11.10.11.05 Removal Action Technical Support • WBS 04.11.10.11.06 C-340 Loose Material Removal <p><u>INTRODUCTION</u></p> <p>The purpose of the Decontamination and Decommissioning (D&D) project is to plan and implement the decontamination, decommissioning, infrastructure removal, and required waste management activities associated with the C-340 Complex at the Paducah Gaseous Diffusion Plant (PGDP). Materials generated as a result of the D&D will be dispositioned either through reuse or appropriate disposal pathways. The facility has been subdivided into sectors and zones to facilitate efficient disposition. Known contaminants include low enriched uranium, trace transuranics, beryllium dust, asbestos, and polychlorinated biphenyls (PCBs) in paint and potentially in switchgear components. Some systems are known to contain holdup material that will be rendered passive for deactivation prior to component/piping removal. The potential exists that additional chemical and radiological hazards will be identified during infrastructure removal. Prior to any activity inside the building, a facility safety authorization basis (SAB) must be in place. A Facility Description Document (FDD) and Hazards Assessment Document (HAD) are under development to evaluate the type of authorization basis required for the facility. If the facility is determined to be a nuclear facility, additional SAB documentation will be developed.</p> <p>C-340 has a combined footprint of approximately 65,000 square feet, and is made up of the C-340-A Powder Building (42,000 ft²); C-340-B Metals Building (17,920 ft²); and the C-340-C Slag Building (4,400 ft²), and the C-340-D Magnesium Storage Building (3,888 ft²). The C-340-A, B, and C buildings are all physically connected, residing under a single roof. The facilities were constructed in the 1950's, and used through the 1970's for reduction of uranium hexafluoride to uranium tetrafluoride by reaction with hydrogen, then further reduction of the uranium tetrafluoride in a foundry type operation to uranium metal. The facilities are metal frame structures, with transite exterior walls, and built up roofs. The C-340 A and B facilities are single level or single level with operating platforms. The C-340-C Slag Building includes 4 different floors.</p>			

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<p>The C-340-D Magnesium Storage Building is a prefabricated metal building, used for the receipt and storage of drums of magnesium for use in C-340 operations. The C-340-D Facility is currently utilized as a warehouse/storage facility for ongoing D&D Operations at the Paducah Site. The C-340-D building is connected to the C-340 A, B, and C facilities by a sloped conveyer system used to transport magnesium drums from the ground floor warehouse to the third floor of C-340. the conveyer is enclosed in a protective housing.</p>		
<u>LOGIC RELATIONSHIPS</u>		
Interfaces:		
<u>Internal</u>		
<ul style="list-style-type: none">• All project managers and staff• All subcontractors		
<u>External</u>		
<ul style="list-style-type: none">• U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office (PPPO) and support contractors• DOE Headquarters or other DOE sites (if applicable)• U.S. Environmental Protection Agency (EPA)• Commonwealth of Kentucky (KY)• Site tenants including United States Enrichment Corporation (USEC); Uranium Disposition Services, LLC (UDS); and Swift & Staley Team (SST)• USEC services in the area of property, information technology, radios, etc.• SST, particularly in the areas of property management, information technology, and security.• Nevada Test Site (NTS): Profiling and disposition of newly generated, classified, and fissile low-level waste (LLW), if required or applicable• EnergySolutions: Profiling, treatment, and disposition of mixed and LLW, if required or applicable.• TCSA Incinerator, if required or applicable• Commercial TSD Facility: For treatment and disposal of non-radioactive hazardous waste, if required or applicable• Stakeholders• Citizens Advisory Board and supporting contractor Edward Holmes Incorporated.• DOE Integrated Safety Management System (ISMS) Verification Team.• Other nonregulatory key interfaces.		
Time Sequencing with Other Work:		
<ul style="list-style-type: none">• An EECA, Action Memorandum, and RAWP will be developed and approved prior to initiating D&D activities• The SMP requires completion of demolition by 9/30/17.• Infrastructure removal must be completed prior to beginning Facility demolition.• Removal action completion report will be completed following building demolition.		
<u>SCOPE DESCRIPTION</u>		
WBS 04.11.10.11.01 C-340 Subproject Management		
<p>Provide overall management activities associated with this subproject. Activities performed under this sub-element include the following:</p>		
<ul style="list-style-type: none">• Perform technical, contractual, and project functions necessary to effectively manage and report		

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<div>scope, schedule, and budget;</div> <div><ul style="list-style-type: none">• Maintain all activities within the defined safety, environmental, and quality requirements;• Perform technical and personnel management functions;• Maintain technically qualified and properly trained personnel;• Develop, evaluate, and report project performance metrics; and• Interface with customer, regulators, and other stakeholders, as needed. The method(s) used for determining earned value for this WBS element is Level of Effort.</div> <div>This element also includes the activities necessary to support the development of a Removal Notification, Engineering Evaluation and Cost Analysis (EE/CA), Action Memorandum (AM), and a Removal Action Work Plan (RAWP) for the infrastructure removal and facility demolition of the C-340 Complex. These documents will be required prior to initiating D&D activities. Further, a Removal Action Completion Report will be generated following completion of the facility demolition. This element includes development of the documents, submitting to the regulatory agencies and stakeholders, including the public, as necessary, and resolution of comments in order to gain regulatory agency approval.</div> <div>The CERCLA Documentation for the C-340 Complex will also meet the requirements for documentation under the National Environmental Policy Act.</div> <div>WBS 04.11.10.11.02 C-340 Infrastructure<div>Perform all activities necessary to safely remove and disposition all components and items from within the C-340 Complex. This activity includes the removal of facility equipment, installed real property, utility service components, tanks, sumps, along with the removal of asbestos, LLW, and PCB-contaminated items and disposition of removed materials. Wastes may include MLLW, TSCA, RCRA, TRU waste, and asbestos-containing material (ACM). The work process includes the following:</div><div><ul style="list-style-type: none">• Identify systems• Characterize/analyze hazards• Mitigate hazards• Disconnect equipment• Remove equipment/material• Characterize material• Treat/package waste• Stage waste materials• Transport waste• Off-site treatment/disposal• The method(s) used for determining earned value for this WBS element is Percent Complete.</div></div> <div>WBS 04.11.10.11.03 C-340 Facility & Structure<div>This element includes activities necessary to demolish the structure remaining after completion of the removal of process and chemical equipment is completed in the previous (Infrastructure D&D) Phase. Buildings will be removed to the slabs and any holes, basement, etc. will be backfilled. This phase will include development of EE/CA, Action Memorandum, and Removal Action Work Plan supporting the Facility Structure D&D; implementation of the structure D&D consistent with the CERCLA documentation; and waste disposition.</div><div>The method(s) used for determining earned value for this WBS element is Percent Complete.</div></div> <div>WBS 04.11.10.11.04 C-340 Newly Generated Waste</div>		

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<p>Activities in this WBS will involve in waste packaging, management, and waste disposal. These activities include establishing an area designated for processing and packaging of wastes generated during the Infrastructure removal, obtaining necessary materials and equipment for waste packaging, coordinating with on-site waste management subcontractor to place any hazardous or TSCA wastes in appropriate storage, and packaging and transfer of wastes for treatment and disposal.</p>		
<p>WBS 04.11.10.11.05 Removal Action Technical Support</p> <p>This element includes activities required to plan and initiate the Infrastructure D&D (process and chemical equipment) removal from the C-340 Complex. This activity will include preparation of the RAWP and submittal to the regulatory agencies; coordination of PRS field staff and self-performing United Steel Workers (USW) and supervision, and integration of field activities with support subcontractors including but not limited to Davis Bacon craft and supervision; field engineering; radiological control support; waste operations subcontractor; and nuclear criticality support subcontractor, and management of generated wastes.</p> <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p>		
<p>WBS 04.11.10.11.06 C-340 Loose Material Removal</p> <p>This element includes the activities necessary to support disposition of stored materials from the C-340 Complex. Scope will include necessary activities to identify material, planning, designing, scheduling, and executing the removal of the material from the Complex; preparation for shipment of material and packaging and shipment of materials for disposal.</p> <p>The method(s) used for determining earned value for this WBS element is Percent Complete.</p>		
<p><u>DELIVERABLES</u></p>		
<p>04.11.10.11.01 C-340 Subproject Management</p> <p><u>Element Milestones:</u></p> <ul style="list-style-type: none">• None <p><u>Element Deliverables:</u></p> <ul style="list-style-type: none">• Paducah Contractor Quality Assurance (QA) Project Plan• Paducah Contractor environmental, safety, and health (ES&H) Plan• Provide input to the following reports and submittals (if applicable):<ul style="list-style-type: none">○ Monthly Project Performance Report○ Risk Management Plan Updates○ Site Management Plan (SMP)○ Semiannual Critical Analysis Report○ Presentations○ FFA briefings○ Labor Standards Determinations○ Gold Chart Performance Metrics○ Annual updates to STP○ Annual Compliance Agreement Report○ Annual ISMS Update○ Annual Work Smart Standards Update○ Financial Reporting, Management Analysis Reporting System		

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<ul style="list-style-type: none">o Annual Statement of Costs Incurred and Claimedo FFA Semiannual Progress Reporto Remedial Action/Regulatory Commitment Tracking Reporto Other reports/documents, as necessaryo Removal Notificationo EE/CAo AMo RAWPo Removal Action Report		
04.11.10.11.02 C-340 Infrastructure <u>Element Milestones:</u> <ul style="list-style-type: none">• Work completed before 09/30/17. <u>Element Deliverables:</u> <ul style="list-style-type: none">• None		
04.11.10.11.03 C-340 Facility & Structure <u>Element Milestones:</u> <ul style="list-style-type: none">• Work completed before 09/30/17. <u>Element Deliverables:</u> <ul style="list-style-type: none">• None		
04.11.10.11.04 C-340 Newly Generated Waste <u>Element Milestones:</u> <ul style="list-style-type: none">• Work completed before 09/30/17. <u>Element Deliverables:</u> <ul style="list-style-type: none">• None		
04.11.10.11.05 Removal Action Technical Support <u>Element Milestones:</u> <ul style="list-style-type: none">• Work completed before 09/30/17. <u>Element Deliverables:</u> <ul style="list-style-type: none">• None		
04.11.10.11.06 C-340 Loose Material Removal <u>Element Milestones:</u> <ul style="list-style-type: none">• Work completed before 09/30/17. <u>Element Deliverables:</u> <ul style="list-style-type: none">• None		
REQUIREMENTS		

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- CERCLA/National Contingency Plan
- KY Hazardous Waste Permit (KY8-890-008-982)
- FFA for the PGDP
- SMP for the PGDP, Paducah (annual revisions)
- Applicable state and federal laws and regulations [applicable or relevant and appropriate requirements (ARARS)]
- Contractor ISMS
- UEO-1066, as updated, Lease Agreement between DOE and USEC, Revision 4 dated October 30, 2001
- Enclosure to GDP 95-0018, as updated - USEC and DOE Resolution of Shared Site Issues, Revision 1, dated March 30, 1998
- Applicable contractor plans, policies and procedures.
- Waste acceptance criteria (WAC) for all applicable treatment and disposal facilities that were in effect on April 24, 2006.
- Applicable DOE Orders
- Applicable Federal Acquisition Regulations

It is the core value of the Contractor that the safety and health of every worker, the public at large, and our environment are the most important assets that we are entrusted to protect. To accomplish this, an ISMS, based on DOE's ISMS, has been implemented that incorporates the five core functions and is based on the seven guiding principles. The objective of ISMS is to systematically integrate safety and environmental protection into the planning and execution of all work activities. The term safety encompasses Nuclear Safety, Industrial Safety, Industrial Hygiene, Occupational Health, Health Physics, and environmental issues. ISMS requirements flow-down to contractor subcontractors. The five core functions are (1) define the scope of work, (2) analyze hazards, (3) develop and implement hazard controls, (4) perform work within controls, and (5) provide feedback and continuous improvement. The seven guiding principles are (1) line management responsibility for safety, (2) clear roles and responsibilities, (3) competence commensurate with responsibility, (4) balanced priorities, (5) identification of safety standards and requirements, (6) hazard control tailored to work being performed, and (7) operations authorization.

Before a subproject begins, several activities must be completed that demonstrate that all involved in the project have completed rigorous health and safety reviews and that all potential hazards of doing the work have been identified. The routine activities in remedial actions are conducted in accordance with standard operating procedures, activity hazard analyses, and Integrated Safety Management plans. Nonroutine work will require a readiness assessment, as necessary, to ensure complete health, safety, and environmental reviews prior to work start. This assessment is conducted by people experienced in similar kinds of work with the right to examine all aspects of a project about to commence and requires that the project team provide documented evidence that any applicable requirements of the job have been met.

SCOPE ASSUMPTIONS

- C-340 maintains status as a moderate hazard Radiological Facility.
- The primary regulatory driver is CERCLA as implemented through the FFA.
- One series of CERCLA for the D & D of C-340 assumed to require D1&D2 reviews.
- Implementation of the five core functions and seven guiding principles of the ISMS are included.
- The subcontractors will provide their own personal protective clothing and respiratory protection.

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<ul style="list-style-type: none">• No event occurs which initiates bumping of USW work force, resulting in retraining requirements for new workers.• Fire Hazards Analysis Equivalency Determination is granted by DOE, and does not result in work stoppage or delays.• Wastes encountered shall be regulated as LLW, RCRA, and/or TSCA. Concentrations of transuranics shall be below the levels to be categorized as TRU waste.• C-746-U Landfill will be available for construction debris type materials generated by building demolition.• Transportation and disposal of materials shall be an ongoing effort.• Buildings shall be removed to the slab level.• Slab and soils removal will be included in other activities.• Removable contamination on the floors and/or steel will be decontaminated if practicable using normal decontamination techniques (washing, scrubbing, wiping, vacuuming, etc).• Aggressive techniques (scabbling, sandblasting, etc) will be considered for localized areas if such techniques can be applied and reduce waste disposition costs through reduction of waste volumes requiring disposition as low-level waste.• Fixatives or encapsulants will be applied as required to protect surfaces awaiting demolition, or to prevent release of contamination during the demolition process.• Scope of effort includes removal and disposal of the building structure and infrastructure.• No further NCS or NDA surveying is required.		
<u>COMPLETION CRITERIA</u>		
The end state for the C-340 Outyear D&D Project will be as follows:		
<ul style="list-style-type: none">• All infrastructure (process equipment, piping, valves, electrical equipment, conduit, etc) will be removed from the building, and the facility will be demolished to slab, in accordance with a to be developed Removal Action Work Plan, Engineering Evaluation and Cost Analysis, and Action Memorandum addressing the C-340 Complex.• Basements and below grade areas will be filled with grout or other similar measures taken to prevent accumulation of rain water and to eliminate fall hazards.• Asbestos and hazardous materials will be removed prior to demolition.• Remaining slabs will be either decontaminated or fixative applied to stabilize any removable contamination.• Wastes generated from infrastructure removal and facility demolition will be disposed of in accordance with appropriate regulatory requirements.• Where cost effective, equipment or items that may be reused or recycled will be transferred to receiving projects, companies or organizations.• Infrastructure removal, building demolition, and waste disposition will be completed by 9/30/2017.		
<u>RISK MANAGEMENT</u>		
See Risk Management Plan for analysis.		
<u>CERCLA AREAS AND SWMU</u>		

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RAIMS No.	SWMU No.	Description	DMSA No.
	477	C-340-B Metals Plant	
	514	C-340-D Reject Magnesium Fluoride Storage Silo	
	515	C-340 "Dirty" Dust Collection System	
	516	C-340 Derby Preparation Area Sludge Collection Sys	
	521	C-340 Saw System Degreaser	
	522	C-340 Work Pit Located at Ground Floor Level	
	523	C-340 Metals Plant Pit Ground Floor at F-6 to F-11	
	524	C-340 Pickling Sump	
	529	C-340 Powder Plant Sump at Ground Floor Level	
	101	C-340 Hydraulic System	
	378	G-340-01	
	379	G-340-03	
	380	G-340-04	
	381	G-340-05	
	434	S-340-01	

BASIS OF ESTIMATE

1. Summary of Site Conditions

2. Estimating Methods

☐ Parametric ☐ Bottoms-Up ☒ Other: Planning Estimate

3. Sources of Estimating

- This estimate is based on the information provided in the statement of work, reference documents, and interviews conducted with individuals familiar with the condition and current regulatory status of the C-340 Complex.
- The basis of estimate for the skill/professional workforce staffing is based on PRS's experience on projects similar to the C-340 Infrastructure Removal project such as Maine Yankee and Georgia Technical Research Reactor Decommissioning, Sandia National Laboratories decommissioning projects, and Fernald Waste Pits Remedial Action Program project.
- Travel costs are based on the Federal Travel Regulations (FTR).
- Fuel, Oil, Gas, and Maintenance (FOGM) costs are based on Construction Industry Blue Book rates.
- Where Government Furnished Equipment (GFE) is not available, equipment rental costs are Shaw E&I national contract lease rates.
- Material and other direct costs (ODCs) are based on vendor quotes, previous estimates for similar work on the national alliance contract, and equipment cut sheets from manufacturer catalogs.
- Low value equipment (e.g., small hand tools, etc.) is priced as a multiplier based on personnel direct labor cost.
- Materials and supplies derived from labor estimate and types of maintenance activities required.

4. Basis of Estimate (Unescalated Values)

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WASTE VOLUMES

See attached waste performance metrics, as applicable.

PROJECT SCHEDULE

See attached schedule.

BASELINE BY YEAR

See attached Baseline by Year Report.